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AUTHOR Jones, Thomas H.; Amalfitano, John L.
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ABSTRACT

By the late 1980s, fiscal crises, tax revolt measures, education reform, and other factors had prompted 28 states to institute state lotteries as a supplemental means of public finance. This paper presents findings of a study that examined whether or not lotteries enhance public education spending. Data for 1987 from all 50 states were compared and examined using regression analysis to answer the question: Is school finance enhanced in lottery versus nonlottery jurisdictions? The analysis included four dependent variables, two indicating "support for education" and two "tax effort for education" and two independent variables indicating the presence or absence of a state lottery. Findings showed that state lottery revenues did not help schools. State per-capita income was the most powerful environmental determinant of school support. Wealthy states that adopted lotteries in advance of other states provided higher levels of school support than nonlottery states; lotteries alone did not make states wealthy. It is recommended that states renounce lotteries altogether. Six tables are included. Contains 14 references. (LMI)

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THOMAS H. JONES & JOHN L. AMALFITANO

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DO STATE LOTTERIES ENHANCE THE FINANCING OF PUBLIC EDUCATION?

By the late 1980s, fiscal crises, tax revolt measures, education reform, and other factors had prompted 28 states to institute lotteries as a supplemental means of public finance. Support of the public schools was the single cause most frequently invoked for legalization. Here we report on a study that provides a nation-wide empirical test of the claim that lotteries enhance public education spending.[1] (Jones and Amalfitano, 1994)

The study is grounded within a political claim of many lottery advocates that the existence of the games leads to increases in educational funding. Opinions for and against this view abound; some empirical research already has been done. It is reasonable to assume that the claim impacts policy (Hancock, 1987; Thomas & Webb, 1984). And in fact political and fiscal policy links between lotteries and education have been established in 22 states and Washington, D.C. (LaFleur, 1988).

The two questions we address in this study are central to the understanding of lotteries' role in school finance.

1. To what extent can state lotteries explain variation in support for public education among the states?

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2. Do states' claims about the *uses* of lottery revenues impact educational finance? That is does earmarking matter?

To be clear, our study posits a *comparison* among the fifty states and asks, "Is school finance enhanced in lottery versus non-lottery jurisdictions?". Lottery advocates have made school financial enhancement claims--in some states for several decades. It seemed reasonable to assume that lottery states will, by now, be financing schools better than non-lottery states for reasons attributable to the lottery, if advocates claims have any validity.

DESIGN

Economists and public finance specialists have developed well accepted, fairly standard approaches for assessing the impact of state fiscal measures on education spending. This body of literature, referred to as "expenditure determinants studies", explains why states follow particular fiscal patterns. (Bahl, 1969; Dye, 1976; Strudwick 1985). We rely on this approach. We add state lotteries to the "traditional" measures and forms of analysis, considering them as another set of variables potentially helping to explain inter-state differences in school support.

Traditional social, economic and demographic variables were selected to represent educational cost factors, fiscal ability, and the expenditure preference (tastes) of residents in individual states. Indicators of support and spending effort were regressed on the state characteristics. In the regressions we use four specific dependent measures, two indicating "support for education" and two "tax effort for education". Together these four measures indicate support and effort for education.

Lottery variables indicated the presence or absence of a lottery in each state, and any earmarking legislation. Hierarchical regression techniques were used to control for the influence of the significant traditional determinants and facilitated examination of the relative ability of

lotteries in explaining interstate variation in each indicator of support and each measure of effort. T-tests were conducted to establish whether or not those states that support schools with lottery revenues simply exhibit higher levels of support or effort.

Our data are from the year 1987, one of the last in which lottery states and non-lottery states had roughly comparable social, economic and demographic characteristics required for a comparative analysis of this type. See Table 1.

TABLE 1
A LIST OF MEASURES AND THEIR ABBREVIATIONS

The support measures:

1. Per pupil state aid, *(SA)*
2. Per pupil state-local expenditures,*(SL)*

The effort measures:

1. State school aid as part of state government expenditures, *(SAEF1)*
2. state-local school expenditures as a percent of state personal income,*(SLEF2)*

The lottery measures:

1. Presence or absence of a lottery,*(L)*
2. lotteries earmarked for education by state statute, *(LOTED)*

The socioeconomic and demographic predictor variables:

1. Per capita income,*(PCI)*
2. School age population,*(SAP)*
3. Percent of population non-white,*(PNWT)*
4. Urbanization,*(URB)*
5. Private school enrollment, *(PVSE)*
6. Population density,*(PSQM)*
7. Educational attainment of the population *(PPHS)*

FINDINGS AND DISCUSSION

In 1987 eighteen states had adopted a policy establishing public education as a major recipient of net lottery revenue. Seven states named schools as the sole recipient of lottery revenue, and five of these had lottery revenues actually *exceeding* federal funding to the public schools in that year. The other eleven states routed some lottery funds to education through the general fund, or by designating schools as one among several recipients.

Our findings reaffirm the importance of state wealth, as measured by per capita income, in determining support for education. Of the variables considered in the model, state per capita income is by far the most powerful environmental determinant of school support. School age population, percentage nonwhite, urbanization, and adults' school completion rates were also significant in some regressions. *See tables 2 through 8.*

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insert tables 2 through 8 about here with accompanying discussion

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DISCUSSION OF THE TABLES

The first regression procedure explains variation in state aid (ref. Table 2). The lottery for education variable (LOTED) enters on step 4 after per capita income, percentage of population non-white, and urbanization. At this step in the predictive power of the equation, (R^2), does not increase. This leveling-off of R^2 is accompanied by a slight increase in the standard error of measurement, clearly indicating the lack of predictive value of lottery status of the states. The magnitude and insignificant t value of beta is further testimony to apparent

insignificance of lottery status of the states as a determinant of per pupil state aid.

As indicated in Table 3 , LOTED is also unable to explain a significant amount of variance in per pupil state-local expenditures. When lottery status of the states is entered into the equation at step 3, R^2 shows a very slight increase, from .659 at step 2 to .665. The increase of .006 in R^2 is insignificant. The Beta of .088 and its concomitant, non significant t value reaffirm the lack of predictive ability of the lottery status of the states in explaining per pupil state-local expenditures.

An examination of Tables 4 and 5 reveals that a lottery which is purported to support public schools has negligible ability in the prediction of either measure of effort to fund education after the effects of "traditional" predictors have been taken into account. In Table 4 the lottery status of the states is unable to explain any significant amount of variance when it is forced into the regression equation.

In Table 5 we see that lottery status of the states is entered into the equation after educational attainment of the population has entered in a stepwise fashion. When lottery status of the states is entered into the equation at step 3, the predictive power of the equation increases from .296 to .315. This increase of almost 2 percent in explained variance is the largest change accounted for by the lottery variable. Nevertheless, the influence of lottery status of the states in explaining interstate variation in SLEF2 remains insignificant in relation to the explanatory ability of school age population and educational attainment of the population . An examination of the betas and t values reaffirms this conclusion.

After testing the assumption of equal variances, pooled t-tests were conducted to answer the following question: Is there any significant difference between states which used lottery funds to support public schools K-12 and states which did not with respect to indicators of support and effort for education? Table 6 contains the results of the

four t-tests. The 50 states and the District of Columbia have been divided into two distinct groups. Jurisdictions that purported that the lottery enhanced educational funding in 1987 were "yes" states. States that did not operate a lottery in that year (or claimed to use lottery revenue for another dedicated purpose) were categorized as "no" states.

The two groups of states are listed under each dependent variable. The means, standard deviations, standard errors of estimate, degrees of freedom, and pooled variance t values are also presented in the table. Results of the first t-test indicate that states earmarking all lottery funds for public schools, and states channelling lottery funds to cities and towns through the general fund, had a mean per pupil state aid figure of $2247 in the year 1987. The mean for states that did not operate a lottery and states that ran a lottery but used the funds for another purpose is $1913. The t value of 1.34 indicates that these two means are not significantly different.

A second t-test determined that the mean in per-pupil state-local education expenditures is significantly ($p < .01$) higher in those states which purported that the lottery helped public schools. The states that claim to give lottery moneys to schools have an average state-local expenditure of $4348. The other 32 states had a mean spending level of $3362.

Significant mean differences ($p < .05$) in education's state budget share are also indicated by the lottery status of the states. In states where it was claimed that the lottery enhanced public school finance, per pupil state aid averaged 15.3% of per pupil state general expenditures. Per pupil state aid in the other states averaged 23.5% of state general expenditures.

Citizens in both categories of states spent approximately four cents out of every dollar earned on public education K-12. A t-value of 0.50 indicates no significant difference between the means of the two groups. Additional analyses appear in the book.

Since our model explains low to moderate amounts of variance in school support and tax effort, the lottery variable has maximum opportunity to account for unexplained variance. If state lotteries had an important impact, then it is reasonable to expect the lottery should emerge as a significant predictor in at least one or more of the statistical analyses. In fact, lotteries don't add significant predictive power to any of them.

Lotteries had explanatory "space"; they simply had very little or no explanatory "power". This finding is paramount. The fact that lottery revenues have little if any predictive power suggests that states are not likely to enhance public education significantly by implementing the "lottery for education" proposals espoused by some politicians and lottery advocates.

In no equation does lottery status of the states explain a significant amount of variation in support and effort for education. Lottery states did provide higher levels of school support than non-lottery states in 1987. This may provide some solace to lottery proponents; however, the finding is less significant than it appears at first glance. In concert with other data, a claim that lotteries influence state aid or school spending cannot be supported. Lottery states actually used a smaller share of their wealth for education than non-lottery states. Once per capita income is statistically controlled, the presence of a lottery cannot account for a significant amount of interstate variation in school finances. It is true that statistical controls of the type used in this study always raise methodological issues. However, the analysis shows that it is wealthy states which adopt lotteries in advance of other states, not lotteries which make states wealthy.

It is ironic that lotteries are operated and rationalized to "help" schools in those states where personal income levels are generally higher than the national average, and where tax effort levels are lower. Yet it is often

the wealthiest states, with high absolute fiscal burdens, which have turned to lotteries as an alternative means of public finance. By no means do we feel we have fully addressed all the possible explanations for lottery adoption, but of the following we do feel quite sure: Lotteries reflect, in some very rough and indirect sense, the public's perception of the tax burden (Filer, Moak, and Uze,1988; Allen 1991).

CONCLUSION

The findings of this study indicate that state lottery revenues do not help schools. In this finding we corroborate other studies that use different designs (Hartwig, 1987; Stewart, 1987; Borg and Mason, 1987, 1990; Starke, Honeyman and Wood, 1991). If the fiscal incidence of lottery funds is statistically undetectable, surely they have no practical effect either.

These findings are not surprising. It is well settled in public finance economics that earmarking funds for particular uses has no effect (Gold, 1990). What *is* surprising--and to our minds unjustifiable--is that states should rationalize their gambling implementations through appeals to this discredited technique.

Accordingly we propose that in every state where school financial claims have been made, a notification be put on each lottery ticket and terminal. *"The State of 'X' has determined that lotteries may not provide improved levels of school funding."*

We do not think such a notification would greatly affect sales. But such a notification might affect sales at the margin, just as warning labels on cigarette packs have marginally affected sales. More important, states do have an obligation to tell the truth. After years of misleading statements, ticket buyers and the taxpaying public should know that lotteries' education finance claims are false.

A drawback to the above proposal is that it might indirectly encourage governments to make similar political claims for public services other than education. States could claim that the money goes for health, eldercare or other worthy causes, and in fact some states already do this. Education should not foist its problem onto other public sector activities. This brings us to our second, and preferred policy alternative: *States should renounce lottery profits altogether.* In our book we discuss ways this might be done.

More broadly we view lotteries, and other forms of state sanctioned gaming, as symptomatic of the fiscal problems inherent in the modern welfare state. Governments' programs have grown beyond the willingness of most taxpayers to finance them. Sold to the electorate on the grounds that they will reduce other taxes or provide better services, lotteries do neither. They become one of government's false promises, alienating substantial portions of the citizenry.

Governments are the sponsor, administrator, regulator, and chief financial beneficiary of a major gambling game. We view these multiple roles as an ethical problem with practical consequences. Even under the most optimistic of scenarios, gambling could meet only a tiny fraction of a state's revenue needs. Only through renouncing lottery profits, we feel, can the state reclaim its rightful, legitimate role as regulator of the games.

Table 2. Stepwise Multiple Regression and Multiple Correlation Coefficients of the Basic Determinants Model Explaining Variation in Per Pupil State Aid (SA) (N = 51).

Step Number	Variable Entered	*R*	R^2	SE Est.	Increase in R^2	Beta	*t*
1	PCI	.593	.351	706.8	NA	.553	3.756*
2	PNWT	.645	.403	685.1	.052	.372	3.298**
3	URB	.676	.457	660.4	.005	.346	2.786**
4	LOTED	.675	.457	660.7	.000	−.012	0.089

*$p < .001$.
**$p < .01$.
Note: variables above the dotted line are significant predictors.

Table 3. Stepwise Multiple Regression and Multiple Correlation Coefficients of the Basic Determinants Model Explaining Variation in Per Pupil State-Local Expenditures (SL) (N = 51).

Step Number	Variable Entered	*R*	R^2	SE Est.	Increase in R^2	Beta	*t*
1	PCI	.784	.614	672.7	NA	.696	6.659*
2	PPHS	.812	.659	638.5	.045	.234	2.651**
3	LOTED	.815	.665	638.5	.006	.088	0.852

*$p < .001$.
**$p < .05$.
Note: variables above the dotted line are significant predictors.

Table 4. Stepwise Multiple Regression and Multiple Correlation Coefficients of the Basic Determinants Model Explaining Variation in State Aid as Percent of State General Expenditures (SAEFI) (N = 51).

Step Number	Variable Entered	*R*	R^2	SE Est.	Increase in R^2	Beta	*t*
1	LOTED	.166	.027	.235	NA	.166	1.183

Note: variable is not a significant predictor.

Table 5. Stepwise Multiple Regression and Multiple Correlation Coefficients of the Basic Determinants Model Explaining Variation in State-Local Education Expenditures as a Percent of State Personal Income (SLEF2) (N = 51).

Step Number	Variable Entered	R	R^2	SE Est.	Increase in R^2	Beta	t
1	SAP	.416	.173	7.58	NA	.444	3.329*
2	PPHS	.544	.296	7.07	.123	.360	2.961*
3	LOTED	.560	.315	7.05	.019	.151	1.129

*$p < .01$.
Note: variables above the dotted line are significant predictors.

Table 6. Differences in Indicators of Support and Effort for Education (ISEE) between States Which Use a Lottery to Support Public Schools and States Which Do Not (LOTED).

Variable and Group	Mean	Standard Deviation	SE	df	t Value
SA					
LOTED yes	2,247	995	228	49	1.34
LOTED no	1,913	768	135		
SL					
LOTED yes	4,348	970	223	49	3.54*
LOTED no	3,362	964	170		
SAEF1					
LOTED yes	.153	.055	.013	49	2.42**
LOTED no	.235	.289	.050		
SLEF2					
LOTED yes	.0405	.006	.0015	49	0.50
LOTED no	.0417	.009	.0016		

*$p < .01$.
**$p < .05$.

NOTE

1. The full study appears in book length form. Jones, T.H. and J.L. Amalfitano, 1994. *America's Gamble: Public School Finance and State Lotteries.* Lancaster, PA: and Technomic Publishing Co., .

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